SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the characteristics and parameters of an Op-Amp 741 with two examples.

17. Explain the process of solving simultaneous equations using op-amps.

18. Discuss the basic principle and instrumentation of a PLL system.

19. Explain applications of the IC 723 general-purpose regulator and switching regulators. Discuss their design considerations, performance, and typical use cases.

20. Elaborate working of a universal shift register (IC 74194) and its different modes of operation.

NOVEMBER/DECEMBER 2024

23PPH13 — LINEAR AND DIGITAL ICs AND APPLICATIONS

Shanmuga Industries Arts & Science College T.V.Malai

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is integrated circuit (IC)?

2. Illustrate the input and output pin configuration of the Op-Amp 741.

3. How Voltage-to-Current (V to I) converter is working?

4. Mention application of a Logarithmic amplifier.

5. List the features of the frequency response of a 1st order Butterworth low-pass filter.

6. Write the main purpose of a Phase-Locked Loop (PLL) in electronic systems.

7. Write the working principle of a series Op-Amp voltage regulator.

8. What is the function of a pass transistor in a linear regulator?

9. List out the function of IC 7483 in a digital circuit.

10. Write the role of IC 7485 in digital systems.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Classify Integrated Circuits (ICs) based on their functionality.

Or

(b) Discuss the characteristics of an ideal operational amplifier and how they differ from a real Op-Amp?

12. (a) Describe the operation of a Current-to-Voltage (I to V) converter.

Or

(b) Explain the operation of a sample and hold circuit and its typical applications.

13. (a) Discuss the purpose of a Butterworth band-reject filter.

Or

(b) Sketch the functional diagram of the IC 555 timer and describe the role of each key component in its operation.

14. (a) Discuss working principle of a Series Op-Amp voltage regulator and explain how it provides a stable output?

Or

(b) Explain the operation of the IC 723 general-purpose voltage regulator.

15. (a) Design a 4-bit binary adder circuit using IC 7483 and explain how it handles carry propagation.

Or

(b) Design a circuit using IC 74151 to implement a 4-to-1 multiplexer and explain how it selects one of the four inputs.

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